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ON THE VARIABILITY OF O AND B SUPERGIANTS

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Adelman & Albayrak (1997) examined the Hipparcos photometry (ESA 1997) of the A0 to A5 supergiants in the 5th edition of the Bright Star Catalog (Hoffleit & Warren 1991) and found that these stars obey the conclusions of Maeder (1980) that for supergiants of any spectral type the amplitudes increase with luminosity. Here we examine hotter supergiants of spectral type O and B of luminosity classes Ia and Ib as well as intermediate types and also include luminosity class II stars. The results given in Table 1 are consistent with the averages of Maeder for peak to peak V amplitudes although Hipparcos photometry has a somewhat wider bandpass. He gives 0^m072 for B1Ia–B5Ia stars, 0^m060 for B6Ia–B9Ia stars, 0^m039 for both B1Ib–B5Ib and B6Ib–B9Ib stars, and 0^m033 for B1II–B5 II stars, and 0^m021 for B6II–B9II stars.

Table 1: The mean amplitudes of O and B supergiants

Spectral Classes	Number	Mean Amplitude [mag]
O9Ia–B2Ia	33	0.056 ± 0.017
B2.5Ia–B9Ia	26	0.076 ± 0.026
O9.5Iab–B2Iab	7	0.057 ± 0.013
B3Iab–B9Iab	11	0.054 ± 0.017
O8Ib–B2Ib	35	0.041 ± 0.024
B2.5Ib–B9Ib	22	0.040 ± 0.019
O7.5II–B2II	17	0.029 ± 0.010
B3II–B8.5II	16	0.028 ± 0.016

Table 2 (available electronically from the IBVS Web-site as 4946-t2.txt) contains the values for the stars whose averages appear in Table 1 as well as those whose luminosity types had not been divided between subclasses Ia and Ib. We eliminated known interacting binaries with gas streams, e.g., β Lyr, or those which had notes that their variability was spurious due to a companion (HR 4136). They had greater amplitudes than stars

with similar normal spectral types. Still there were four stars which had amplitudes substantially greater than their spectral type peers: HD 14134 (V520 Per, B3Ia) 0^m11 , HD 100943 (B5Ia) 0^m15 , HD 183143 (HT Sge, B7Iae) 0^m15 , and HD 111934 (BU Cru, B2Ib) 0^m16 . Except for HD 183143 (Celestia 2000) these stars have known companions. V520 Per was suspected of being a photometric variable by Rufener & Bartholdi (1982) (as was HD 100943) and confirmed by Waelkens et al. (1990). Examination of Hipparcos photometry by Krzesinski et al. (1999) did not yield a period. BU Cru is a known eclipsing binary. It is close to, but not an IRAS source (Friedemann et al. 1996). Such stars should be studied further to understand their large amplitudes for their spectral types. Perhaps one or more might be interacting binaries.

Several stars had amplitudes of 0^m01 and 0^m02 . Of particular note are HR 2618 (ϵ CMa, B2II), HR 2596 (ι CMa, B3 II), HR 3825 (B5II), HR 2657 (γ CMa, B8II), and HR 3571 (B8-9II) with standard errors of 0^m0005 or less. These are among those stars with the most stable Hipparcos photometry. Although supergiants are usually considered to be stars whose atmospheres are in considerable motion, we find a few which are relatively stable. This raises the question of whether there is something special about them relative to other luminosity II class B stars, e.g., in a different stage of evolution, or whether they just in a normal quiescent stage which occurs infrequently.

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